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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,831

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Jun Izumi

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EXAMINER

ZEMEL, IRINA SOPJIA

ART UNIT

PAPER NUMBER

1796

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



<b>Office Action Summary</b>	<b>Application No.</b> 10/551,831	<b>Applicant(s)</b> IZUMI ET AL.	
	<b>Examiner</b> Irina S. Zemel	<b>Art Unit</b> 1796	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 2-3-2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4,5,7-9,21,23,25,26,28 and 29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-5, 7-9, 21, 23, 25-26, 28-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |



## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 4-5, 7-9, 21, 23, 25-26, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodemura U.S. Patent 6,472,082 , (hereinafter "Kodemura").

The disclosure of Kodemura is discussed in detail in the previous office action, which discussion is incorporated herein by reference.

As discussed in the previous office action, Kodemura discloses a modified thermoplastic norbornene polymer obtained by graft-modifying process in the presence of organic peroxide. A thermoplastic norbornene resin is a cycloolefin having ethylene segment, column 2, lines 43-55; column 6, lines 1-25, wherein radicals R<sup>1</sup> to R<sup>8</sup> is/are in the form of hydrocarbon group; column 5, lines 53-67; columns 7-13. Thus, the cycloolefin copolymer of Kodemura invention, meets the limitations of the claimed cycloolefin polymer. The graft monomer includes epoxy and unsaturated carboxylic compound including carboxylic acid and maleic acid, column 14, lines 13-55. The graft reaction takes place in the presence of organic hydrogen abstracting peroxide in an organic solvent. See all illustrative examples 1,2, comparative examples, for example.

Kodemura discloses a process for producing graft modified norbornene polymer in the organic solvent medium in the presence of peroxide at a temperature of 60 to 350 C, column 15, line 51, and under nitrogen with stirring at 40 C, column 26, Example 1.



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The amount of organic peroxide initiator is added in the range of 0.001 to 10 parts by weight per 100 parts by weight of the unmodified thermoplastic norbornene polymer, column 15, lines 43-45. The resulting modified thermoplastic norbornene polymer has high rate of graft modification of at least 10 mol% and can be prepared into high concentration solution, column 4, lines 19-26 and column 16, lines 22-55. The rate of graft modification of the modified thermoplastic norbornene polymer is generally within a range of 10 to 100 mol %, column 16, lines 35-36. Kodemura does not specifically address the dropwise addition of the organic solvent solution of the peroxide, however step-wise addition of any reactant is well known in the art for controlling reaction rates. In addition, it is well established by the case law that sequence of adding any components to the process is prima facie obvious absent showing of unexpected results that can be clearly attributed to the addition sequence.

The resulting modified thermoplastic norbornene polymer has excellent in heat resistance, electrical properties such as dielectric constant, moisture resistance, adhesive properties, and suitable for use as overcoats, interlayer, column 4. lines 1-2; column 4, lines 41-47; column 38, lines 60-62; column 39, lines 9-12.

Insofar as the newly added limitation to the ratio of the peroxide to the reactive grafting agent, the reference does not expressly disclose those ratios or their effects. However, illustrative examples (such as illustrative examples 1,2, etc., and number of comparative examples), the ratios of these two components appears to be closely corresponding to those disclosed in illustrative examples 3 and 4 of the instant specification, thus anticipating the claimed ratios. In addition, the reference provides



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numerous examples (illustrative and comparative), where the ratios of two components are varied leading to different final products. Thus, in the alternative, if the actual ratios are not anticipated by the examples, it would have been obvious for an ordinary artisan to vary the amounts and ratios of the peroxide and grafting agent to arrive to the final product of the desired structure. It is noted that the claimed ratios of peroxide to grafting agents are NOT disclosed or recognized as governing the uniformity of grafting characteristics. The only relevant disclosure of the reference is concerned with side reactions and hydrogen abstracting, which has nothing to do with uniformity of grafting, but rather pertains to actual grafting (degree of grafting) reaction. Also, as evident from illustrative and comparative examples of the instant specification, the claimed ratios do not appear to be the decisive factor in obtaining the claimed correlation coefficient.

Kodemura does not disclose a distribution degree of the graft-modified cycloolefin copolymer in the base polymer in the claimed range of 0.01 to 0.1 or the empiric equation represented by formula (1) in referring to a calculation of the distribution degree of the functional group-modified cycloolefin copolymer in the base copolymer. This formula is based on the experiments for obtaining the desired properties for desired application. However, in view of close similarities of the process disclosed in the reference, substantially similar reactants, their amounts and similar conditions of the reactions, it is reasonably believed that the claimed distribution degree is inherently present in the products obtained via the process disclosed in the Kodemura reference. The burden is shifted to the applicants to provide factual evidence to the contrary.



### ***Response to Arguments***

Applicant's arguments with respect to the pending process claim have been considered but are moot in view of the new ground(s) of rejection.

The arguments regarding the disclosure of Kodemura are still pertinent to the outstanding rejection set forth above. However, those arguments are not found persuasive.

The applicants state that Kodemura does not teach or suggest "that the amount of organic peroxide initiator added is dependent on the amount of polymerizable unsaturated groups of the modifier compound that are present. In Applicants' method, the peroxide compound is added in an amount such that the ratio of the peroxide compound to a polymerizable unsaturated group in the modifier compound in terms of number of moles of radicals is 0.7-2.5/1. Applicants have found this range to be important because, as described on page 31 of the specification as filed, if this ratio is below 0.7, adequately abstracting hydrogen from the base polymer is difficult, while if this ratio is above 2.5 the radicals are involved in undesirable side reactions other than hydrogen abstraction. Recognition of this relationship is not present in Kodemura, and Kodemura fails to teach or suggest a process for producing modified cycloolefin copolymers by adding a peroxide compound according to this relationship."

While the examiner agrees with the statement that the Kodemura reference does not recognized or expressly disclose that the claimed relationship as being important to the side reaction/hydrogen abstraction, the examiner, as discussed in the rejection



above, does not agree with the statement that the reference does not disclosed relative amounts of peroxide/modifier. It appears, as discussed above, that the amounts disclosed in example fully correspond to the claimed ratios of the components. In addition, as discussed above, the reference implies that any of the ratios are expected to be satisfactory for the invention so long as the claimed degree of grafting is achieved (and the reference provides ample guidance for varying the degree of grafting), in the absence of showing of unexpected results. There is no showing anywhere on the record that the claimed ratio of the components results in any unexpected results.

The applicants further argue that “while Kodemura discusses that a high rate of graft polymerization is preferred, it does not discuss the uniformity of the modification of the base norbornene polymer, which is one feature of Applicants' method as expressed in terms of the distribution correlation coefficient. The Office Action asserts that the distribution correlation coefficient value recited in the claims is inherently present in the modified norbornene polymer of Kodemura. However, given that Kodemura does not control the ratio of peroxide radicals to radicals of polymerizable unsaturated groups in the modifier compound, in addition to the lack of any focus on the uniformity of the functional group addition, it is entirely speculative to assume the distribution degree of the modified norbornene polymer in Kodemura falls with the distribution correlation coefficient values recited in the claim.’

The examiner agrees that Kodemura does not disclose or discuss the uniformity of the modification of the base norbornene polymer as expressed in terms of the distribution correlation coefficient. However, as discussed above, it is believed to be an



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inherent characteristic of the modified polymer as a result of the disclosed modification process. It is noted, however, that contrary to the applicants arguments, there is absolutely no evidence on the record that controlling peroxide/modifier ratio has anything to do with the uniformity of the functional group addition. The only disclosure of the importance of the claimed ratios discussed in the instant specification on page 31 relate such ratios to the side reactions/hydrogen abstraction, not the uniformity of graft addition. As evident from illustrative examples 3 and 4 of the instant application, and comparative examples 1 and 3 of the instant application (having comparable ratios of the components), the ratios of peroxide to reactive modifier(at least by itself) is not the reasons to which the claimed uniformity can be conclusively attributed. Thus, the claimed ratios are not illustrated as being the critical element for the uniformity of the grafting, even if, arguendo, such uniformity is unexpected from the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irina S. Zemel whose telephone number is (571)272-0577. The examiner can normally be reached on Monday-Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571)272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Irina S. Zemel/  
Primary Examiner, Art Unit 1796

Irina S. Zemel  
Primary Examiner  
Art Unit 1796

ISZ